

# Leopard Coachlines – smooth running on biodiesel

A major New Zealand bus company, keen to do the right thing both for the environment and for its business, decided to move to a fuel that produces lower greenhouse gas emissions. Here's how they did it.

## Background

Canterbury-based Leopard Coachlines started out in the early 1970s with a modest contract to transport Darfield children to school. Soon after, it took the opportunity to transport skiers to the newly opened Mount Hutt ski field. Coach tours were the next logical development.

Business has since expanded to include the urban transport market, with Leopard Coachlines now operating major metropolitan bus routes in Christchurch. Today, the family-owned bus company is one of New Zealand's largest. It has 150 staff (plus 90 expected to join in November 2010) and more than 100 buses with depots in Christchurch and Auckland.

## Getting started

Increasingly aware of the use of environmentally-friendly biofuels in Europe, and keen to be an industry leader at home, Leopard Coachlines decided to trial a biodiesel blend for 12 months. In May 2007 the entire fleet switched over to B5 – a 5% blend of biodiesel with ordinary diesel.

The biodiesel was made from tallow, a by-product of the meat industry. It was supplied in 1,000 litre plastic tanks and manually blended on-site with ordinary diesel. This, together with the fact that it needed to be mildly warmed in winter (as tallow-based biodiesel can 'gel' in very cold temperatures) made the fuel's use during the pilot period "a bit labour intensive," says general manager, Matt O'Malley.

Leopard Coachlines' vehicle manufacturer, MAN, was comfortable with the move to B5 but advised that using blends higher than B5 would negate the vehicles' warranties. However, after conducting research, Leopard Coachlines decided to go ahead and trial two of its vehicles on B20 (a 20% blend).

Their confidence was borne out. The fleet ran smoothly during the course of the pilot, both on B5 and B20, with no extra use of fuel or increase in maintenance costs; no vehicle modifications were required. A marked reduction in particulate emissions was also noted.

## Next steps

With the success of their year-long pilot behind them, Leopard Coachlines was convinced of the benefits of biodiesel. The company discontinued its use temporarily to prepare for a move to a new, bigger Christchurch depot. At the depot they installed a 4,000 litre fuel tank to store B5, and two 1,000 litre tanks for B20, at a cost of approximately \$12,000. They found a local biodiesel supplier, who produces biodiesel from a mix of used cooking oil and oilseed rape.

In January 2010 Leopard Coachlines' fleet started using biodiesel blends again – it has been smooth running ever since.



Lower particulate emissions from biodiesel means cleaner air for Christchurch.



Leopard Coachlines' fleet of buses are all running well on biodiesel blends.

### ✓ Key features

- The entire fleet is running on biodiesel blends (B5 and B20)
- Fuel and maintenance costs remain the same
- A successful pilot period identified room for improvements

### ✓ Key benefits

- Reduced greenhouse gas and particulate emissions
- Marketing spinoff: helps build a 'clean, green image' – especially important in Christchurch, where air pollution is a high-profile concern
- Proved an advantage when tendering for Christchurch metropolitan bus routes
- Positive feedback from customers

### ✓ Sector relevance

- Transport industry
- Tourism industry

## Technology overview

- Biodiesel blends are blends of a percentage of biodiesel mixed with ordinary diesel. The percentage of biodiesel in the blend is indicated by the 'B' name – B5 for a 5% blend of biodiesel with 95% ordinary diesel, B20 for 20% blend of biodiesel with 80% ordinary diesel, and so forth.
- Virtually all diesel vehicles can use a 5% biodiesel blend (B5) without any engine or fuel system modifications. Higher blends, such as B20, are able to be used in many large commercial vehicles such as trucks and buses, provided a few simple checks and steps are followed. Some engine manufacturers also approve the use of up to 100% biodiesel. EECA recommends that businesses check with their vehicle or engine manufacturer, and with a specialist with particular expertise in the field, about the level of blend that's suitable for their vehicle or vessel.
- Biodiesel blends tend to 'clean' fuel systems, loosening dirt and old fuel deposits and carrying them through to the fuel filter. As a result, one or more fuel filter changes may be required after switching to biodiesel, to remove the loosened engine grime.
- Biodiesel is more lubricating, cleaner burning and more biodegradable than ordinary diesel.
- Biodiesel in New Zealand is usually made from vegetable oils, such as used cooking oil or virgin oil from rapeseed crops (canola), or from animal fats like tallow, a by-product of meat processing. Generally, biodiesel that is made from vegetable oils is less prone to gelling at low temperatures than tallow-based biodiesel, which may 'gel' in very cold weather.

## Challenges overcome / lessons learned

The pilot period helped Leopard Coachlines to manage a few glitches. The warming of bulk tallow-based pure B100 biodiesel during winter, and manually blending it to a B5 blend – as detailed in the 'Getting started' section overleaf – were inconvenient. These issues were remedied by switching to canola-based biodiesel and installing bulk fuel storage tanks.

With only 15 to 20 Leopard Coachlines' buses in the North Island at any given time, the expense of installing a biodiesel tank at the firm's 'satellite' Auckland depot was not justified. Therefore, as B5 is not yet commonly available at petrol stations, when buses travel away from Leopard Coachlines' main Christchurch depot, they must refuel on ordinary diesel. Fortunately, biodiesel blends can be mixed with ordinary diesel, so there are no problems with combining the two fuels in the same tank.

## Future strategy

Leopard Coachlines remains very happy with biodiesel and plans to continue the use of B5 and B20 biodiesel blends.

## Key personnel

Matt O'Malley (General Manager, Leopard Coachlines)  
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### Leopard Coachlines' perspective

**Matt O'Malley, General Manager**

"Moving to biodiesel has worked well for us. Certainly there's been no noticeable difference in performance between biodiesel and ordinary diesel – no loss of power or anything. It's dead easy to work with and the buses are all performing well on it.

"We believe we're the first bus company in New Zealand to switch its entire fleet to biodiesel blends. Our use of biodiesel gave us an edge when tendering for Christchurch metropolitan bus routes.

"The particulate emissions are a lot better on biodiesel – definitely a good reduction which keeps Environment Canterbury happy, and that's what we like to see!"

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OCTOBER 2010/EEC1500

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